

Under the head of the sensible qualities of the Air I have mentioned its rarity and density; on each of which I shall deliver a few remarks. — V

Air highly rarified such as exists upon very high mountains produces ~~[illegible]~~ many very distressing effects. These are ~~a quickness~~ a palpitation of the heart — sickness at the stomach, loathing of food — great thirst profuse sweats, sleeplessness, great pain from the action of the sun rays — an aversion from spirituous liquors, ~~[illegible]~~ upon the skin — a quick ~~weak~~ pulse, with great muscular weakness. Mr Saussure who describes these symptoms ~~says~~ as occurring on Mount Blanc in Switzerland says he could ~~not~~ advance more than 15, or 16 steps without stopping to take breath. after resting a

v Le Baron Humboldt who ascended to the summit of the Jenbarraco a mountain in South America 20,000 ~~miles~~ feet above the level of the Ocean, and of course the highest mountain in the world, informed me the ~~the~~ informed me that the rarity of the air, ~~he informed me~~ produced hemorrhages from his mouth, nose & lips, a redness in his eyes, sickness at his stomach and a pain in his breast which continued for several days afterwards. His sense of cold he says was very great, altho' the mercury fluctuated between 40° & 50°: of Farenheit. [The oxygen in the air was reduced by his eudiometer to 19 ~~parts~~ in the 100]. The snow upon this mountain was so soft and yielding, from the light pressure of the air on it that a stone fell thro' it to as if it had been thrown into water, ~~from the light pressure of the air upon it~~ But

few minutes those symptoms went off, but they returned with the last exertion. Even the muscles which accompanied him were affected with immobility of their limbs, ~~and~~ difficulty of breathing - panting & ~~forced on in consequence with the~~ ~~[illegible] and~~ an emission of a plaintive noise. The mercury at this time stood at 12 inches. These symptoms of disease and distress have been attributed to a deficiency of Oxygen in the upper regions of the air, and a ~~[illegible]~~ rapid consumption of the combustible matter in the ~~lungs~~ blood, such as constitutes the impure air discharged by respiration. But they are more probably occasioned by the sudden disproportion between the density of the external & internal air.

— a more extraordinary instance of the effects of the rarity of the air upon the human body occurred at Padua on the 22nd of August 1808. Two gentlemen viz Mr Andreoli and Mr Briochi ascended in a balloon together. ~~down back~~

On the 22d of August, last year, M. Andreoli, and M. Brioschi, ascended in a balloon at Padua.— When the mercury had fallen to 15 inches, about the height of 3¾ miles the latter began to feel an extraordinary palpitation of the heart, without any painful sensation in breathing When the mercury was down to 12, (4½ miles) he was overpowered with a pleasing sleep, that soon became a real lethargy. The balloon continued ascending, & when the mercury was about nine inches, (near six miles) M. Andreoli perceived himself swollen all over, and could not move his left hand.— When the mercury had fallen to 8,5 [about six miles and a quarter,] the balloon burst with a loud explosion, and began to descend rapidly with much noise, which awoke M. Brioschi. It fell about 12 miles from Padua, without any injury to the aerial travellers.

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The ~~difference between the~~ less distressing effects of the air upon Baron Humboldt than the adventurers in the Balloon probably arose from the more gradual manner in which the Baron was exposed to it. ‡ The ~~[illegible]~~

Symptoms of disease and distress that have been mentioned, have been ascribed to a deficiency of oxygen in the upper regions of the air, but I shall presently mention another cause which probably cooperates with it. ~~[illegible]~~ air exceptional

‡ A woman died suddenly in the stage on the summit of the Allegany from an hæmoptysis. She had been affected with a ~~[illegible]~~ weak breast.

Air compressed in its density that is above 28 inches,
~~blood difficult from the~~
by compressing the lungs, renders the return
of the blood difficult from the brain, and thus
produces cephalic congestions. ~~In the years~~
~~1768 & 1770 the mercury in the Barometer stood~~
~~at an unusual increased height in a part of~~
The Pneumonies which occur in a preternatu-
-rally dense air it has been observed by Dr.
Fourtelle resolve themselves by Stools & sweats, and
not by expectoration owing to the pressure
of the air upon the lungs. Asthmatic and
consumptive people suffer greatly from it,
and the same Author says Dropsical patients
exhibit an increase or decrease of swellings
according as the mercury rises or falls in the
Barometer.

The influence of the different degrees of
rarity & density of the air upon the body, may easily be conceived
of by recollecting their effects on fluids in and
out of an exhausted receiver.

V The rarity & Density of the ~~of~~ air like heat & cold act relatively upon the body. ~~#~~

~~The~~ As the suddenness of the changes in the temperature of the air ~~is more~~ affects health & life more than its extremes of heat & cold, so the suddenness in the changes in the density & rarity of the air, produce ~~the~~ worse effects on the body than the ordinary extremes of each of them. Mulcaille a french writer ascribes a number of sudden deaths which occurred at Plevins in Decem 1747 to a sudden diminution of the weight of the air. The mercury fell in two hours ~~in~~ two inches, & 8 lines in the Barometer. It has been remarked that old sores, & Rheumatic pains are often made worse by a sudden diminution of the weight of the atmosphere. = Birds ~~Beasts~~ in Siberia

~~When the density of the air is gradually increased, the body & mind are invigorated by it, but when it is suddenly~~ fall down & are unable to rise ~~to~~ when the air suddenly passes from a rare to a dense state.

~~Density 12 qualities~~ 82 - especially paper all ~~are~~ act differently as seperate or combined.

It has been observed that the ☿ in the Barometer varies in its heights at different periods in the four & twenty hours. It begins to rise in the beginning of the night & continues to rise till midnight, after which it descends till the approach of day - then it ascends gradually till midday, when it again descends till evening, seeking a little while each time before its ascent, & descent. The times of its rest are so regular that B: Humbolt informed me they had served him at one time instead of a Clock or Watch. The greatest changes in the Thermometer generally take place at the precise time of these changes in the Barometer. These facts are important as they tend to throw some light upon the changes which take place in diseases, and perhaps of some of the variations of the state of the System in health. May not the pulse be influenced by them in its frequency & force in the different times of the day and night?

= Birds in some parts of Liberia travellers tell us, fall suddenly from the air, and are unable to rise from the ground when the air passes suddenly from a rare to a dense state.

The rarity & density of the air, and the suddenness ~~of~~ with which it passes into either of these affect the human body more or less according to ~~their comp~~ the quantity or less presence of ~~[illegible] with~~ heat, cold, moisture or dryness in the atmosphere. [being in in 1809 after windsle] We have thus considered the effects of ~~gas [illegible]~~ air acting externally upon the body, but a

~~under this head, I shall introduce an Aut~~ ~~of a~~ new work ~~which~~ has lately been published in France by a Dr Vidal ~~[illegible]~~ upon what he calls "Gas Animal", or in other words upon ~~the influence of~~ Air in its elastic state within the body. ~~[illegible]~~ I shall premise my Aut. of this work by remarking that when excessive in quantity or out of place, there is a great difference between the effects

of Air injected into the blood vessels, & into parts not accustomed to contain it in a healthy Animal, and the gradual evolution of Air from the Solids ~~of the~~ & fluids of the body in a diseased state ~~with~~ after its excitability is nearly or totally expended by irritants, or by matters not belonging to the natural stimuli of life. Recollect here the difference in the effects of irritants applied ~~suddenly~~ suddenly & slowly in the production of pain. ~~to account for this~~ This remark being premised you will be prepared to hear ~~that~~ the following facts collected by Dr Vidal. 1 He mentions many instances of emphysematous swellings in the neck and about the head in palsies and apoplexies. 2 He mentions an instance from D'Etaen of a man ~~from D'Etaen~~ who ~~discharged~~ was afflicted ~~Air ~~per anum~~ when~~ with palpitation of the heart, Cough and Vertigo who emitted Air ~~per~~ anum when ever his body was severely pressed. Several cases similar to this are quoted from Morgagni, Bartholine, and

Rhodius. — 3 He mentions from a Dr Neil the case of a ~~yo~~ newly married young man who ~~contrib~~ after indulging himself to great excess in venery, discharged air only thro' his Urethra in his Venereal intercourse with his wife. p: 81.

4 He mentions from Dr Hales exp^t 19. Art. IV an experiment which proves that Air passes freely from the blood into the stomach & bowels.

5 He mentions the appearances of the blood when drawn from a Vein, and of matter discharged from the stomach in purking, in both of which there are appearances of ~~elastic~~ air in its elastic state.

6 He gives a long list of authors who have discovered Air to be present in ~~non~~ the different cavities of the body after death from a great number of diseases. Portal found it in the brain.

upon the subject of this new and

interesting work, I shall make two further remarks.

1 I have no doubt of the elimination of air from the blood into the stomach & bowels in several diseases, particularly in bilious fevers. This idea occurred to me with great force in the fever of 1793 in which a belching of wind was a constant & distressing symptom during each paroxysm of the fever, and in cases where the stomach and bowels contained neither aliment nor drinks. This discharge of wind ceased with the cessation of the paroxysm of fever. The blood & other fluids in this ~~paroxysm this~~ state of the system flow wholly in a centripetal direction. They are probably partly decomposed from the violent action of the blood vessels upon them ~~partly decomposed~~ in consequence of which they evolve their air in an elastic state.

2 I have mentioned in the history of the pulse a gaseous pulse which occurs

in malignant fevers more especially towards their close and after copious ~~depletion~~ blood letting. ~~In~~ It is full, ~~but~~ and soft, and yields to the lightest pressure. — May not this pulse be kept up by the stimulus of air in a rarefied state in the blood vessels? Dr Hark ~~says~~ says he excited the action of the ~~heart~~ heart after death by injecting air into the blood vessels, and Dr Haller asserts that air stimulates the heart more powerfully than blood itself. — In addition to these facts I shall add ~~two~~ two more viz the escape of air from the vein of a man bled last summer in the hospital 1811 & an intelligent bleeder informed me that he had frequently upon opening a vein heard a noise that resembled the sudden issuing of air from a place in which it ~~was~~ had been confined. —

If the presence of air in an elastic state ~~from~~ be admitted in the body it will account for the sudden deaths induced by the sudden diminution of the ~~big~~ weight of the air at Plymouth. — ~~It induce~~ The deaths were induced by the too sudden expansion of the air in the body stimulating it by over distension to its disorder.

phenomena induced in the body. Italian philosophers &

~~3 B~~ 77 ~~[illegible]~~ on the effects of Winds on
13 Dr health &c 1
~~12~~ 1 D 1 D'

he

Corded

~~I shall as~~ Having considered the effects of heat & cold in their positive & relative ~~effects~~ operation on the human body, I proceed to mention the effects of the winds in producing diseases.

and of the rarity & density of the air

They are hot & cold, wet and dry according to the situation of Countries. E.g. in ~~the~~ ~~Britain~~ the United ~~the~~ States they are hot from the South because they come from ~~the~~ heated Soil, ~~and~~ of ~~Africa~~ America cold from the north, because they come from Canada, & still higher Latitudes. Dry from the west because they come from high & dry latitudes, & wet from the East because they pass along the Atlantic Ocean. In Britain the west wind is ~~moist~~ wet from the same cause as our East wind is wet, — viz it coming across the Atlantic Ocean.

In addition to this operation as hot cold - wet & dry - the winds act upon the body according to the following relative circumstances.

1 Heat is lessened, & cold encreased by them. ~~Heat~~ Cold is encreased by moist winds, &

5 Dr Albert mentions a curious ~~[illegible] high winds are said to carry~~ fact of a high wind producing an Epidemic bilious fever. Upon enquiry it was found it had passed over a lake and by drying it from its immense force, exposed its bottom to the rays of the sun, & thus favoured the production of those exhalations which I shall presently say are the causes of those fevers. Take notice of this fact - for it is contrary of the usual effects of high winds on bilious fevers. They are generally checked by them.

~~The~~ lyzed by such as are dry.

2 Winds are to the body, compared with Air, what ~~the cold bath is to~~ washing it with Water is, to ~~have impression in a cold bath~~ ~~they produce~~ ~~they stimulate it~~ - hence when the body is long exposed to them, they debilitate by ~~the~~ expenditure of excitability. who has not felt fatigue in walking, or travelling against the wind?

3 The transitions of the weather from heat to cold & vice versa more certainly affect the body with debility and disease when they are accompanied with ~~a~~ a high or strong wind. ~~but~~ Catarrh most common when this is the case. But

4 Winds affect the body with debility & disease when they suddenly change from a cooler body, ~~that is~~ even where they are not attended with the least change in the thermometer. This is always the case Dr Moseley says in Jamaica when the wind which generally blows from the East, suddenly blows from the South, or West. ~~It~~

5 ~~The~~ The Winds produce certain changes ~~are said to dispose to colic~~

in the ~~tempers~~ faculties & operations of the mind. At Messina the Sirocco wind which is hot & dry dulls the ~~tem~~ understanding. This fact is so notorious that it is common in that country & in some parts of Italy to call a dull or stupid book, "a Sirocco performance". - The South wind at Rome obtained the epithet of "Plumbeus Auster" probably from its affecting the intellects with heaviness or an inability to act with their customary alacrity. The Air from the Sea at Montpelier is said to produce the same effect. In North. County in England ~~to the sea~~ the wind from the Sea W. ch generally conveys a moisture or a mist with it produces peevishness of tempers known by the name of Sea fret. The same thing occurs in Barcelona in Spain, & from the same cause. The north East wind has an unfriendly effect upon the feelings of the inhabitants of the Middle States of America.

6 The Winds act more uniformly upon invalids than upon healthy people. The

IX The Changes in the weather induced by the Vernal & autumnal equinoxes are unfavourable to health. Dr Currie observed an increase of febrile patients in the Liverpool Infirm^y at these periods, and Dr Denoin says fevers most frequently at those periods.

X The Thunderstorms in the West Indies are sometimes ~~being the principal~~ injurious by ~~over~~ elevating the sea so as to overflow the land where it by mixing with vegetable matters ~~then~~ produces putrefactive ~~&~~ exhalations & fevers, &c

East winds is most hostile to such people than any other. They affect ~~pulmonary~~ asthmatic ~~and~~ consumptive, & Rheumatic patients most. I know a sea Captain who is subject to Asthma who can tell in his bed at midnight when the wind changes to the Eastern points of the Compass.

7 ~~of~~ Winds from any quarter attended with so much force as to constitute a stormy weather, not only produce great changes in diseases, but they affect persons of a certain description, in health. They ~~appear~~ are said to ~~cause~~ bring on parturition — & hence the complaint of women of being called out oftener in stormy weather is probably well founded. Perhaps the labor is induced only by the fear excited by the storm. An Old Nurse informed me she had often observed children to be more affected with the Belly ache in stormy ~~weather~~, than in any other kind of weather. ✓

The late discoveries of the heterogeneous nature of the Air, prepare us to believe it to be capable of decomposition, and of course of a new & morbid arrangement of its constituent parts. It is possible the sickening quality acquired by a stagnating atmosphere, may be confined only to those Airs which are ~~occasionally or~~ frequently agitated by the Winds. I am led to make this remark, by a fact communicated to me by Baron Humboldt, He said that in an extensive country inhabited by several tribes of Indians on the head waters of the Orenoque & Black Rivers in South America, no leaf had ever been seen to be moved by a breath of Air. The Indians have not in their language a word to express Wind, & yet they are not more sickly than persons in other equal circumstances (the absence of Wind excepted)

I not only Winds, but the Absence of all Wind produces disease. Hippocrates long ago mentioned the season "sine aura" as a sickly One. ~~The~~ Calms at sea when of long continuance generally produce sickness. This was remarked in the first ships that ~~sailed~~ embarked in the East India trade from England particularly on board a vessel commanded by a Capt: Lancaster in the year 1603. It has since been taken notice of ~~recognized~~ by Dr Clark in his treatise upon the diseases of East India Voyages.

I shall ~~have occasion~~ pass over the diseases produced by the Winds when they are impregnated with miasmata, ~~they will~~ and other adventitious matters. They will come in more properly hereafter. Introduce here in 1808 relative effects of Seasons & months from No 2

in ~~Other parts of South America~~